

Serie Trigonométrica de Fourier

$$f(x) = C + \sum_{n=1}^{\infty} \left(a_n \cos\left(\frac{n\pi}{L}x\right) + b_n \sin\left(\frac{n\pi}{L}x\right) \right)$$

$$-L \leq x \leq L$$

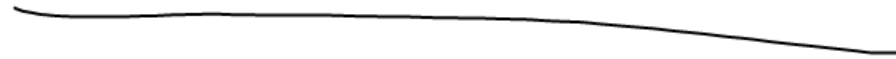
periodo = $2L$ $C = \frac{a_0}{2}$ $a_0 = \frac{1}{L} \int_{-L}^L f(x) dx$

$$a_n = \frac{1}{L} \int_{-L}^L f(x) \cos\left(\frac{n\pi}{L}x\right) dx$$

$$b_n = \frac{1}{L} \int_{-L}^L f(x) \sin\left(\frac{n\pi}{L}x\right) dx$$

$$f(x) = x^2 - 6x + 8$$

$$-4 \leq x \leq 4$$



$$f(t) = e^{2t}$$

$$-1 \leq t \leq 1$$

Simetría en las funciones

$f(t)$ es PAR
 $-L \leq t \leq L$

$$f(t) = f(-t)$$

$$f(t) = t^2$$

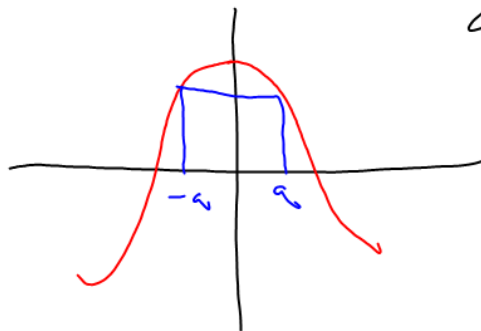
$$f(-3) = f(3)$$

$$(-3)^2 = (3)^2$$

$$9 = 9$$

$$f(t) = \cos(t)$$

$$\cos(-t) = \cos(t)$$

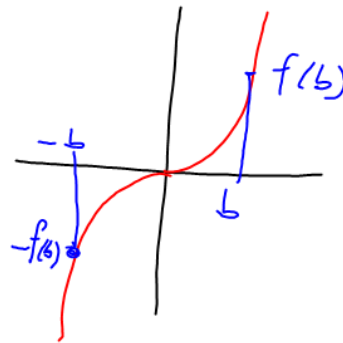


$$f(t) \Rightarrow \text{IMPAR}$$

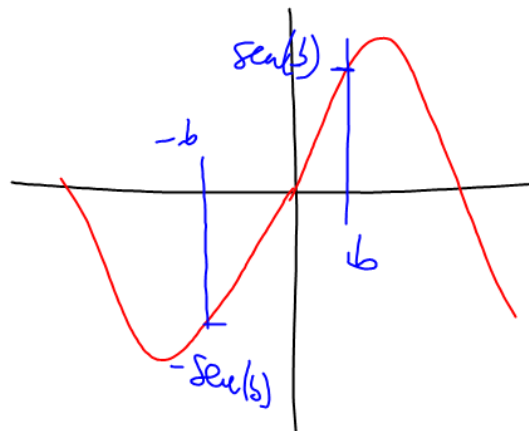
$$-L \leq t \leq L$$

$$f(-t) = -f(t)$$

$$f(t) = t^3$$



$$f(t) = \sin(t) \quad \text{impar}$$



① propiedad simetrías

$$\langle \text{par} \rangle \langle \text{par} \rangle \Leftrightarrow \langle \text{par} \rangle$$

$$\langle \text{impar} \rangle \langle \text{impar} \rangle \Leftrightarrow \langle \text{par} \rangle$$

$$\langle \text{impar} \rangle \langle \text{par} \rangle \Leftrightarrow \langle \text{impar} \rangle$$

②

$$\int_{-L}^L \text{impar} = 0$$

$$\int_{-L}^L \text{par} = 2 \int_0^L \text{par} \neq 0$$

Serie de una función "impar"

SERIE SENO

$$f(t)_{\text{impar}} = \sum_{n=1}^{\infty} b_n \operatorname{sen}\left(\frac{n\pi t}{L}\right)$$

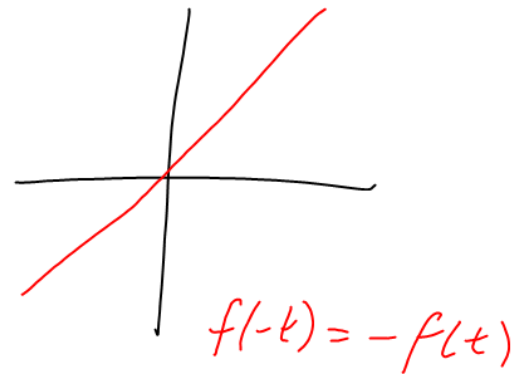
Serie de una función "par"

SERIE COSENO

$$f(t)_{\text{par}} = C + \sum_{n=1}^{\infty} a_n \cos\left(\frac{n\pi t}{L}\right).$$

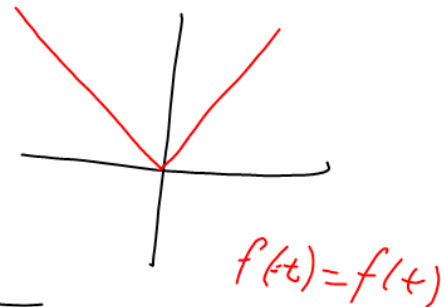
$$f(t) = t \quad \text{impar}$$

SERIE SENO



$$f(t) = |t| \quad \text{par}$$

SERIE COS



$$f(t) = t_1 \quad \text{par}$$

